The First Fifty Years

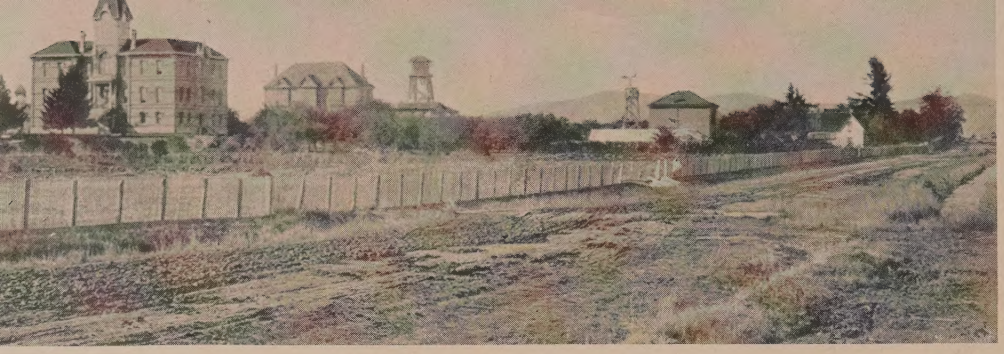
OF THE

Oregon Agricultural Experiment Station

1887-1937

UNIVERSITY OF ARIZONA
LIBRARY

ION CIRCULAR 125
August, 1937
gon State College
ALLIS, OREGON



The State College soon after the establishment of the Experiment Station in 1887. The present "lower campus," shown across this fence, was then used for experimental farm plots.

FOREWORD

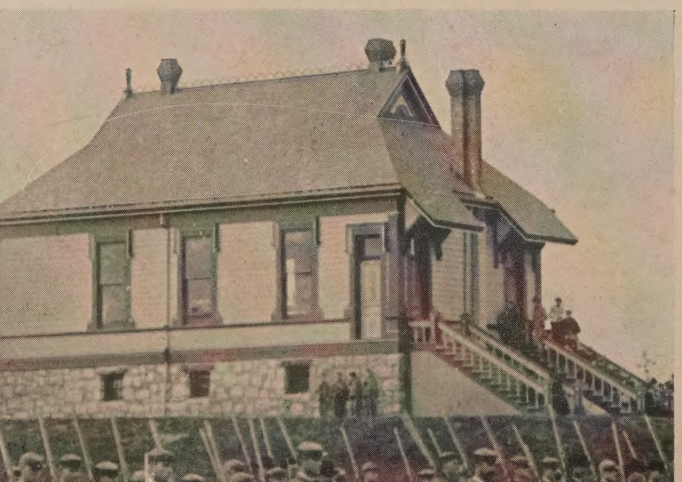
FIFTY YEARS AGO Congress appropriated under the Hatch Act the initial funds that launched the nation upon a program of agricultural research. This program has been continued and expanded through the federal and state supported experiment stations maintained in connection with the land grant colleges, until today it ranks as one of the great research organizations of the world.

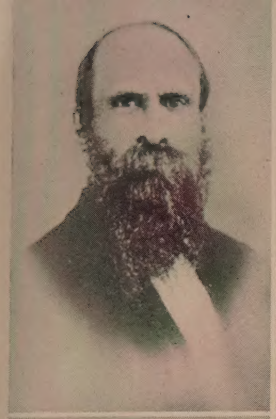
During this fifty years the scientists at the Oregon Agricultural Experiment Station have made discoveries of local, state, national and even world significance, some highlights of which are presented pictorially in the following pages. The station has engaged in both fundamental and applied research, but with attention centered largely on problems of practical importance to farming in Oregon. Its findings have resulted in increased returns to farmers amounting to many millions of dollars annually.

In commemoration of this fiftieth anniversary this illustrated booklet is offered as a graphic record of progress in agriculture made possible through sustained scientific research.

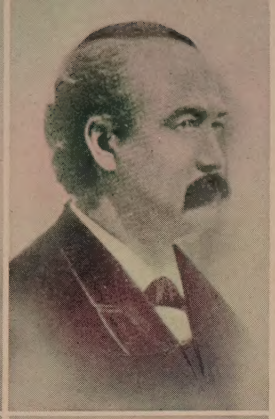
Central tower of present Agricultural Hall in which the Experiment Station headquarters are maintained.

First building, still standing, assigned specifically for Experiment Station use, about 1891. For many years afterwards it housed the campus health service.



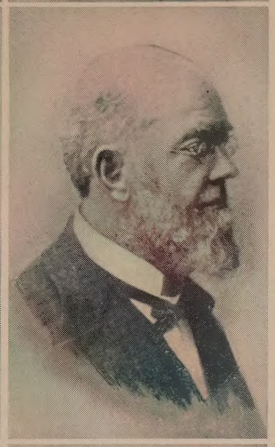


B. L. Arnold
1890-92



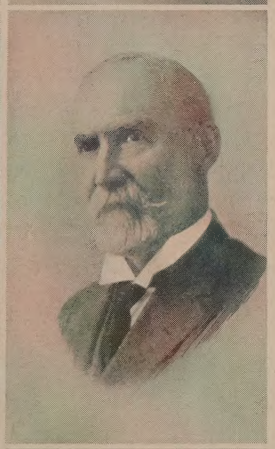
John M. Bloss
1892-96

H. B. Miller
1896-97



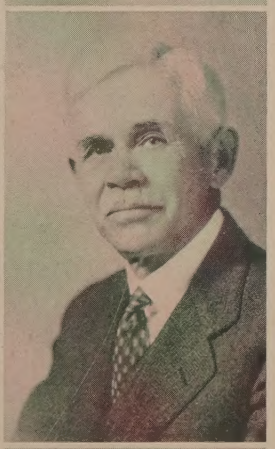
Thos. M. Gatch
1897-1907

W. J. Kerr
1907



James
Withycombe
1908-14

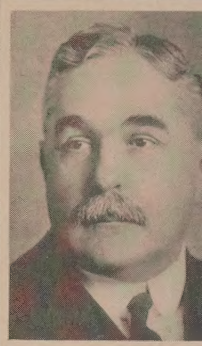
A. B. Cordley
(Right)
1914-20



J. T. Jardine
1920-31

Wm. A.
Schoenfeld
1931-

R. S. Besse
Vice-Director
1931-

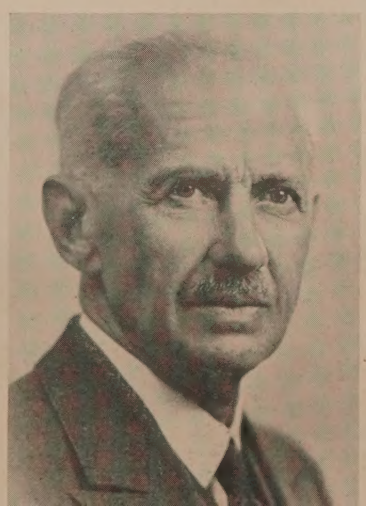


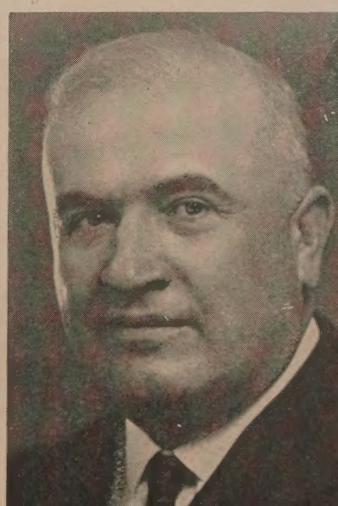
STATE BOARD OF HIGHER EDUCATION. Top row—F. E. Callister, Beatrice Walton Sackett, E. C. Sammons; center—W. E. Pearson, Willard Marks, president; E. C. Pease; bottom row—R. W. Ruhl, C. A. Brand, and Herman Oliver, chairman of the Experiment Station committe of the Board.

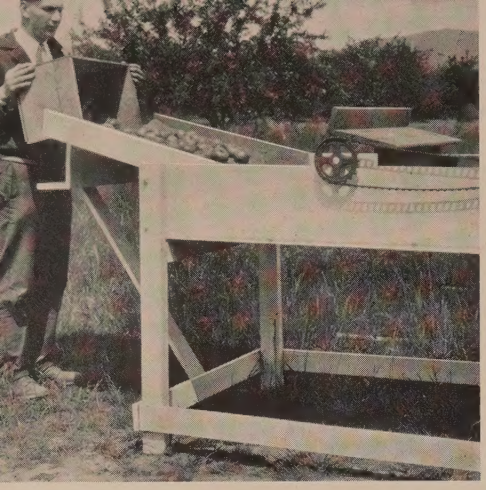
ADMINISTRATION

EXPERIMENT STATION DIRECTORS. At left are all directors from the founding of the station to the present excepting E. Grimm, first director, whose picture is not available. Beginning in 1890, the presidents served also as directors until President Kerr in 1908 relinquished the position to James Withycombe, then vice director.

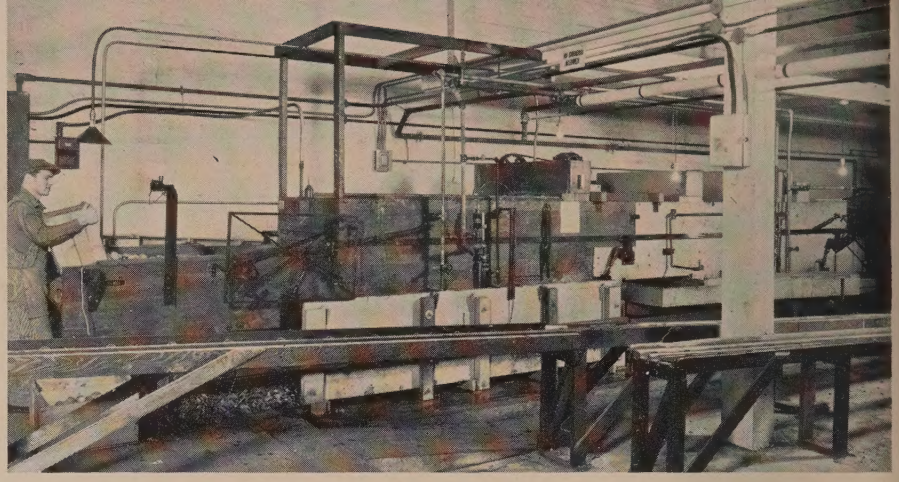
Below—George W. Peavy, President of the College since 1933, and Frederick M. Hunter, Chancellor of the State System of Higher Education.







Feeding apples into first simple station designed farm type fruit washer.



Modern fruit washers like the one shown above in operation cleanse the fruit in one or more chemical solutions, rinse and dry it and deliver the apples or pears to grading and packing machine in perfect condition and in one continous operation.

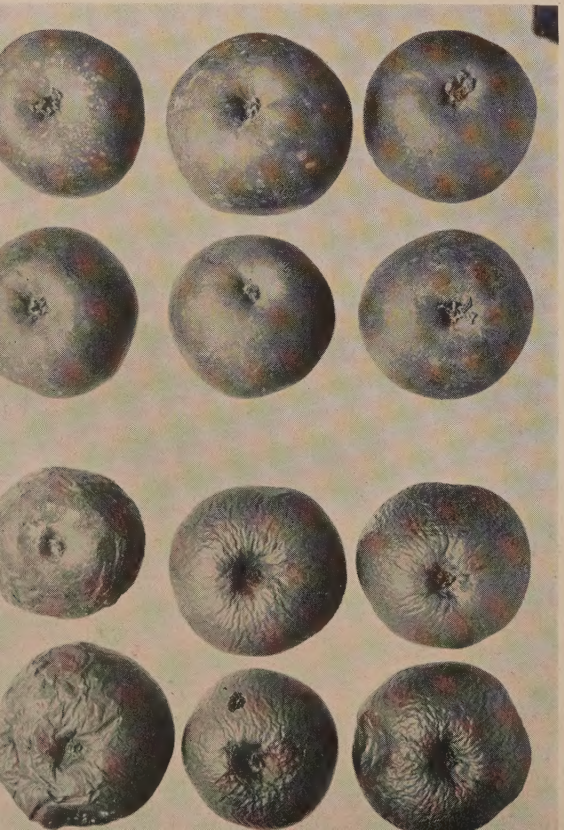
Fifteen Achievements

On this and following pages are pictures depicting 15 of the most outstanding individual or closely related achievements of the Oregon Agricultural Experiment Station. Scores of other accomplishments, many of equal significance but less readily presented in this form, could be cited. No attempt is made to list those included here in order of importance. The use as a matter of record of many old, historic engravings is the cause of the variation in excellence of picture reproduction.

SPRAY RESIDUE

1—DISCOVERY OF A SUCCESSFUL METHOD OF REMOVING SPRAY RESIDUE FROM FRUIT. About 10 years ago Oregon and other western states were threatened with complete loss of eastern and export markets for apples and pears because of strict embargoes against fruit carrying spray residue. Working against time, the Station developed a successful washing process which, with improvements from year to year, has become standard over the world. The process, together with a simple machine for its application, was protected and made accessible to all through public service patents.

A difficult problem was to find a chemical solution which would remove spray residue without harming keeping quality. The six apples at the top were stored unwashed. Six below, from the same tree, wilted when stored washed with unsuitable chemicals.



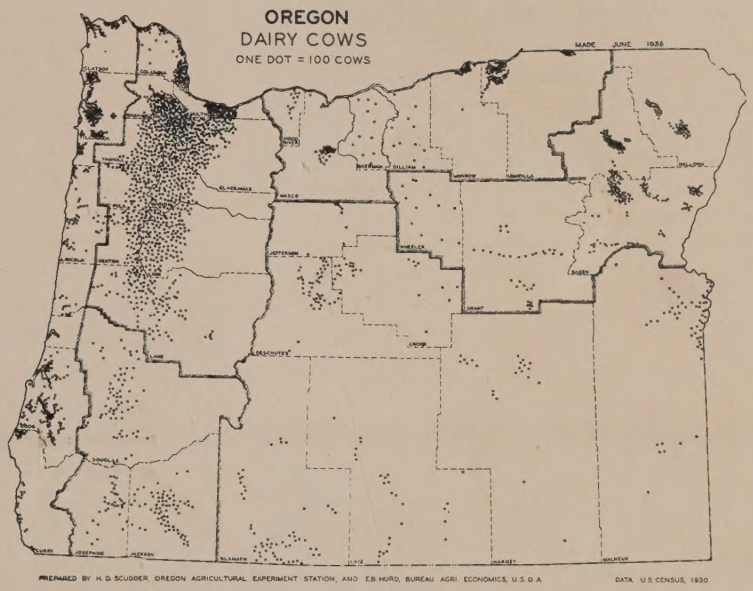
Apples as they came through the same home-made washer shown at left above. This simple but effective machine saved the crop on many farms before commercial washers were available.

A disease-free group of dairy cows taken on a demonstration train helped interest Oregon dairymen in better production methods.

Young Oregon dairy stock, from disease-free herds, find ready markets in other states.

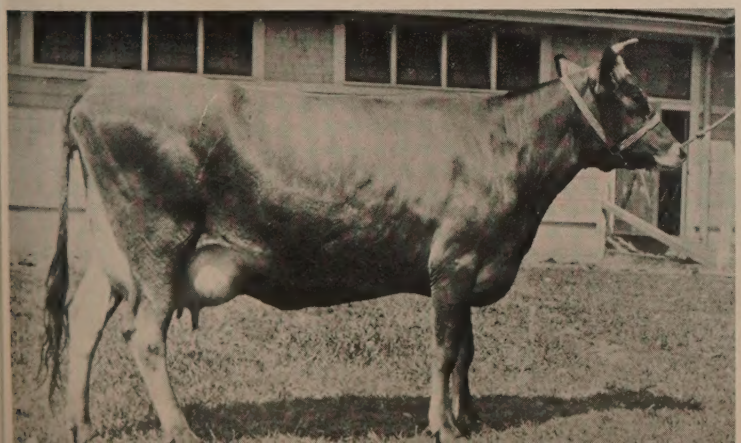
BANG'S DISEASE

2—DISCOVERY OF THE CAUSE AND CONTROL OF BANG'S DISEASE. The O.S.C. Veterinary and Dairy Departments together developed the first system of control for this most common and destructive dairy cattle disease, formerly known as infectious abortion. By using this method Oregon led the nation in the eradication of the disease. Lately the Oregon system has been adopted as the basis for the present Federal campaign against Bang's disease, under which Oregon has a greater percentage of her cattle population tested than any other state.


OREGON
DAIRY COWS
ONE DOT = 100 COWS
MADE JUNE 1936
PREPARED BY H. D. SCUDDER, OREGON AGRICULTURAL EXPERIMENT STATION, AND E.B. HURD, BUREAU AGRI. ECONOMICS, U.S.D.A.
DATA U.S. CENSUS, 1930

Dairying, with upwards of 225,000 cows, is the biggest income producer among Oregon's many farm enterprises. The industry touches every county.

A high producing cow which reacted to the Bang's disease test after the first calf and produced only three normal calves out of seven. The disease strikes the best cows as well as the others.



The college dairy herd, one of the first in the state from which Bang's disease was completely eliminated.

Combine harvester with pick up attachment threshing Austrian winter field peas, a major seed crop introduced by the Station.

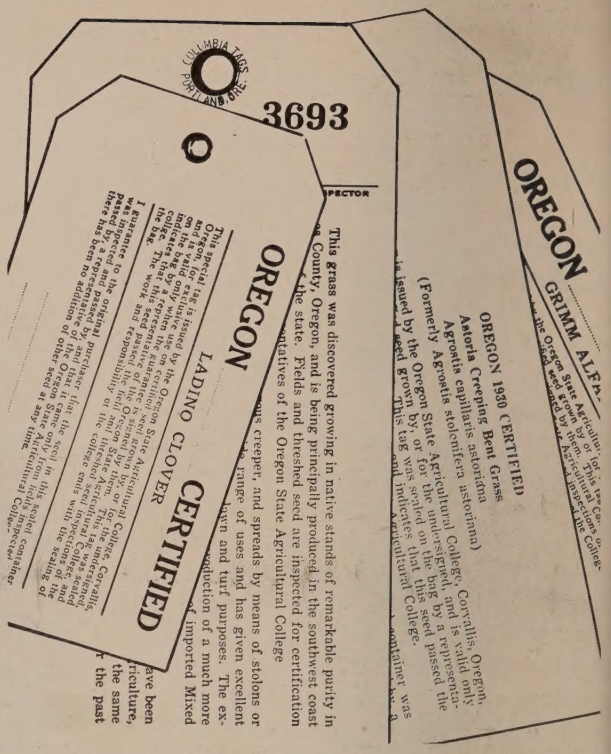
SEED

3—DEVELOPMENT OF THE OREGON SMALL SEED INDUSTRY. Through the introduction of new crops, mostly forage, the Experiment Station in cooperation with the United States Department of Agriculture, has made possible the establishment of Oregon's small seed industry as one of the major enterprises of the state. Seed production fits well into the state's marketing needs as it provides a product of high value capable of being shipped long distances. Growers now receive close to $3,000,000 annually from this industry.

This single sweet clover plant was the lone survivor of a wilt attack in 1921. From it has been developed the present wilt-resistant strain, first to grow successfully in Western Oregon.

A seed crop of Ladino clover in full bloom. Oregon produces 80 per cent of the nation's supply of this seed.

Most Austrian winter pea seed is sold in the south but the crop also makes good forage in Oregon coast dairy sections.


COLUMBIA TAGS
PORTLAND ORE.
3693
OREGON
LADINO CLOVER
CERTIFIED
This special tag is issued by the Oregon State Agricultural College, Corvallis, Oregon, on lots of seed only when inspected by an official inspector. The tag is only issued for the original container of the seed and is not to be used on any other container. The seed represented by this tag has been inspected by an official inspector of the Oregon State Agricultural College, Corvallis, Oregon, and found to be true to variety and of high purity and germination. The tag is issued only when the seed has been found to be free from dodder and from seeds of such weeds as are specified by the Oregon State Agricultural College. The tag is issued only when the seed has been found to be free from seeds of such weeds as are specified by the Oregon State Agricultural College. The tag is issued only when the seed has been found to be free from seeds of such weeds as are specified by the Oregon State Agricultural College.
I guarantee to the original purchaser that the seed was inspected and passed by an official inspector of the Oregon State Agricultural College, Corvallis, Oregon, and that there has been no addition of any other seed at any time
OREGON
This grass was discovered growing in native stands of remarkable purity in County, Oregon, and is being principally produced in the southwest coast the state. Fields and threshed seed are inspected for certification
tatives of the Oregon State Agricultural College
creeper, and spreads by means of stolons or
range of uses and has given excellent
lawn and turf purposes. The ex-
duction of a much more
imported Mixed
ave been
riculture,
the same
the past
OREGON
GRIMM ALFA-
OREGON 1930 CERTIFIED
Astoria Creeping Bent Grass
Agrostis capillaris astoriana
(Formerly Agrostis stolonifera astoriana)
issued by the Oregon State Agricultural College, Corvallis, Oregon,
seed grown by, or for the unsigned, and is valid only
and inspected by a representa-
This tag was sealed on the bag
seed passed the
that this
College.
container was

Through a system of seed certification developed and supervised by the State College, Oregon seed reaches the market carrying such tags as these.

The stubble below is on the oldest field of crested wheat grass in the state, seeded on the Moro Branch Station in 1920. An uncut new planting of this major seed and dry-land forage crop is shown beyond.

Right — Station Plymouth Rock (Q1595), which held national record for heavy breeds in 1925-26. She laid 335 eggs in one year, just 25 short of a crate.

Lady McDuff (C521), world's first hen with trap nest record of 300 eggs in one year. She laid 303 eggs in the laying year 1912-13.

The poultry farm was just south of Kidder Hall (Old Cauthorn) when James Dryden was in charge of the work.

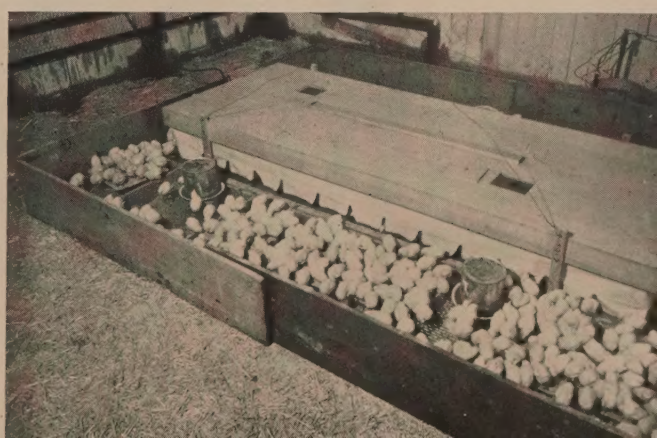
Above—Modern brooder houses with wire screen porches recommended by the Station.

EGGS

4—DEVELOPMENT OF THE SYSTEM OF BREEDING POULTRY FOR EGG PRODUCTION. James Dryden, while head of the poultry department at O. S. C. was first to demonstrate that poultry could be bred for high egg production instead of merely for plumage. He developed the first trap-nested hen to lay 300 eggs in a year, and the first to lay 1000 eggs in her lifetime. An industry based on these and similar discoveries enables Oregon to compete in eastern markets where the bulk of an $8,000,000 egg output is sold.

Below—A station pen of turkeys at Hermiston. Work with turkeys has been expanded recently.

A successful and popular bottom heat electric brooder developed by the poultry and agricultural engineering departments.

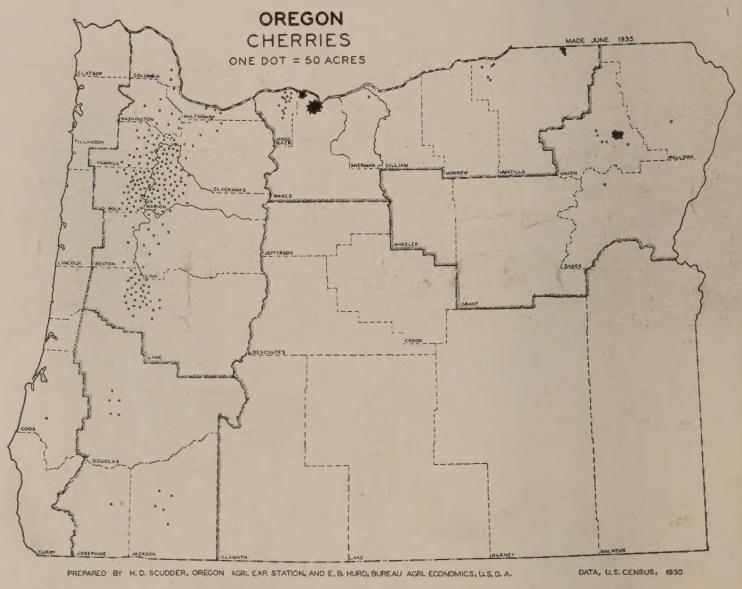


A corner of one of the laboratories in the Food Industries building when cherry brining research was being carried on.

CHERRIES

5—DEVELOPMENT OF A PRACTICAL METHOD OF BRINING CHERRIES FOR THE MARASHINO TRADE. Processing marashino cherries was formerly a trade secret. By using a method developed by the Food Industries section of the Horticultural department at O. S. C., Oregon alone now processes an annual output of 126,000 barrels, replacing former imports. Fully 95 per cent of the domestic production of brined cherries are processed by the O. S. C. method, which thus opened up a $4,000,000 market.

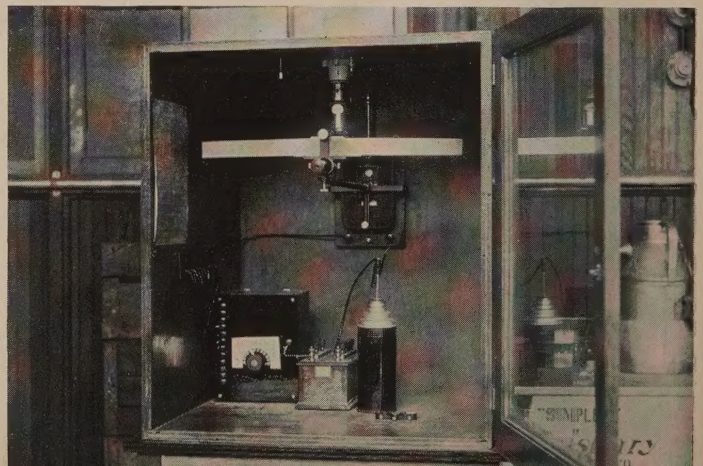
Three of hundreds of test jars put up while solving the cherry brining problem. Jar at left has the proper brine solution.


OREGON
CHERRIES
ONE DOT = 50 ACRES
MADE JUNE 1935
PREPARED BY H. D. SCUDDER, OREGON AGRI. EXP. STATION, AND E. B. HURD, BUREAU AGRI. ECONOMICS, U.S.D.A.
DATA, U.S. CENSUS, 1930

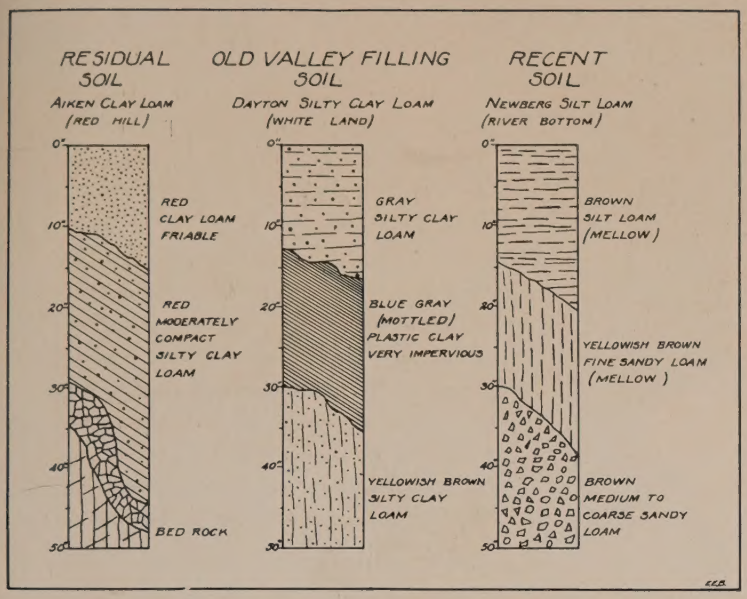
Oregon's 12,000 acres of cherries are concentrated in definite districts.

Below—Cherry pollination was another problem solved by station scientists. Here are two branches from the same tree, one properly pollinated, the other not.

Studies in preserving foods by freezing were begun in 1928. Below is shown a galvenometric thermometer used in making freezing determinations.



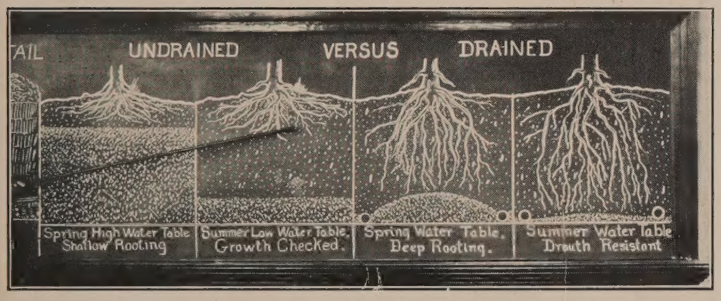
Soil samples are tested in the greenhouse as shown above as part of the detailed soil research work.



Diagrammatic profiles of typical Oregon soils.

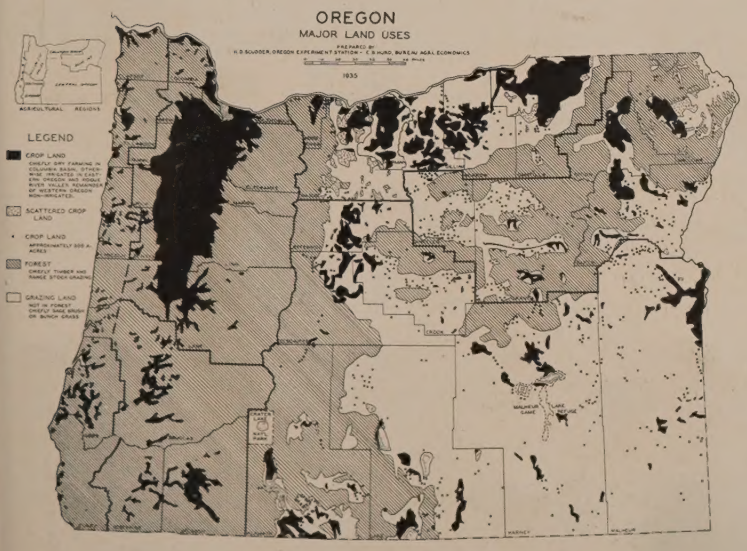
SOIL

6—DETAILED SOIL SURVEYS AND CLASSIFICATION OF MAJOR FARMING AREAS IN OREGON. Through cooperation with the Bureau of Chemistry and Soils of the U.S.D.A. the Experiment Station has surveyed and mapped about 8,500,000 acres of farming land in the state. These surveys provide for all time a fundamental guide to the adaptibility of different soils for the production of various crops, and indicate how each soil type may best be maintained and improved.

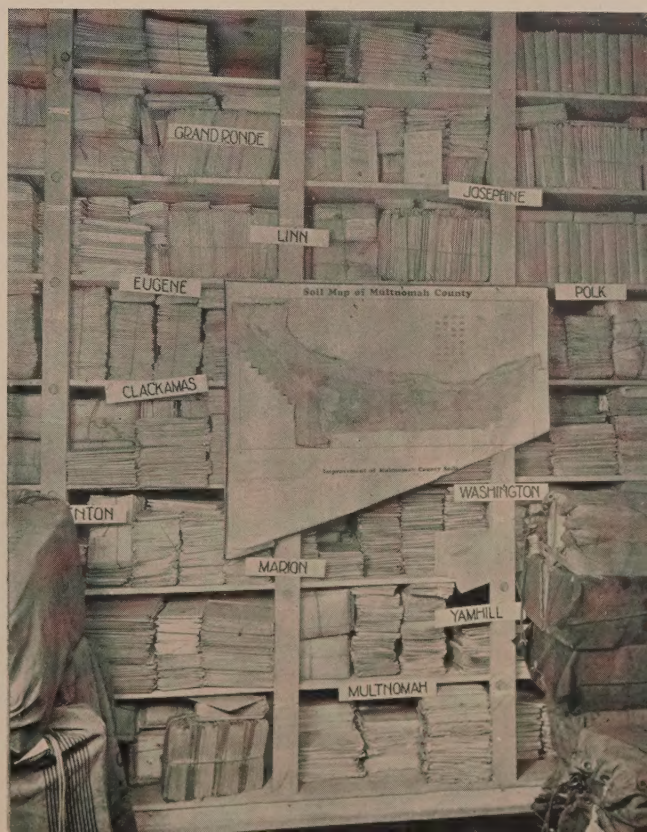


Drainage was early recognized as basic in improving many Oregon soils. The diagram above has been widely used in illustrating the effect of drainage on root growth.

Store room at the college from which are distributed thousands of county soil maps made from the detailed surveys.

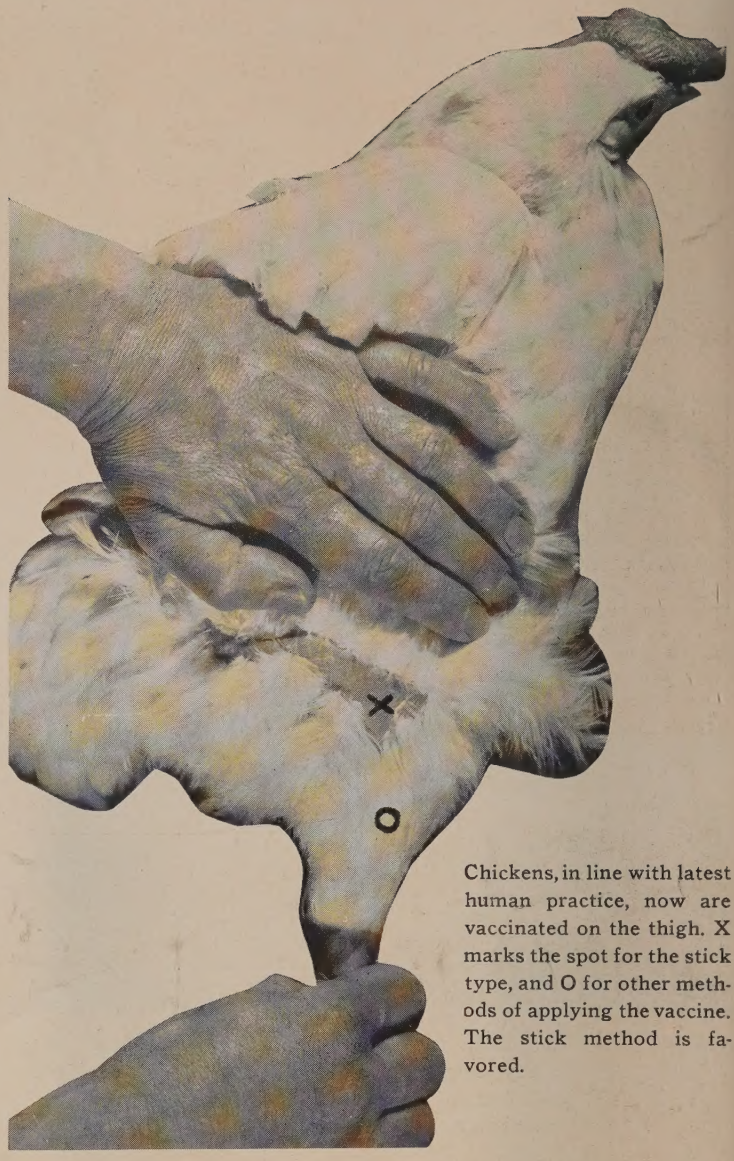


This is a small-scale reproduction of the first accurate map ever made of the state's major land use areas.



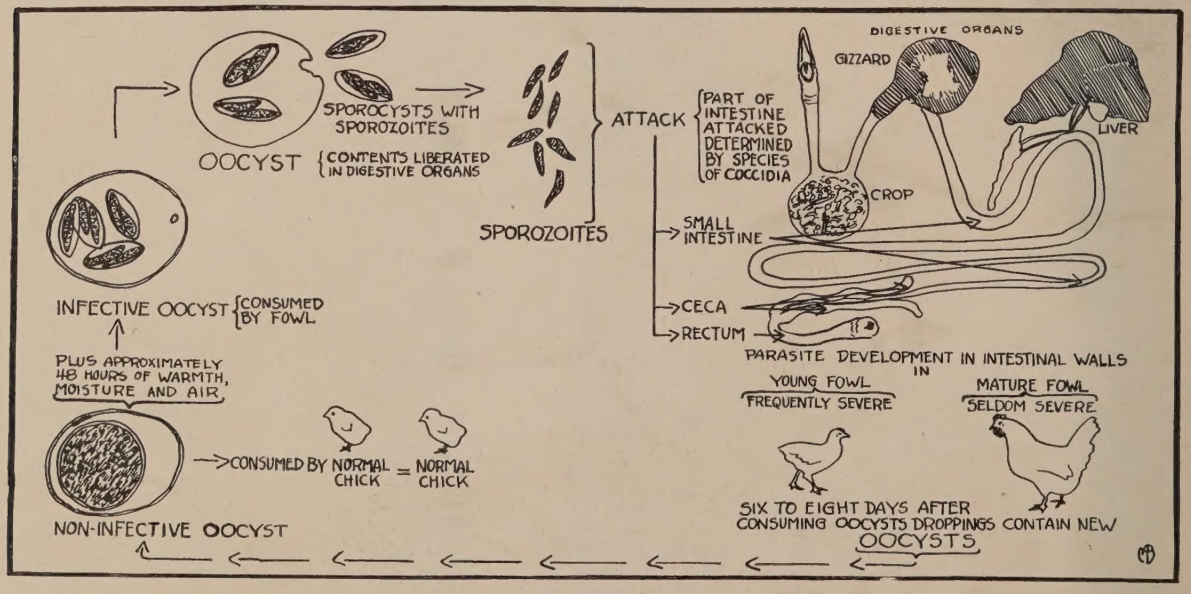
FOWL POX

7—DISCOVERY OF A NEW AND SIMPLE METHOD OF FOWL POX CONTROL. In the veterinary department of the Experiment Station was developed a simple, safe and economical method of vaccinating flocks against fowl pox. This method, which successfully made use of live, unattenuated virus for the first time, has become the standard control practice throughout the world. Fowl pox, which formerly took a heavy toll from the poultry industry, has now been added to the list of preventable diseases. Other work in poultry disease control has saved Oregon poultrymen many thousands of dollars annually and has brought international recognition to the department.



Chickens, in line with latest human practice, now are vaccinated on the thigh. X marks the spot for the stick type, and O for other methods of applying the vaccine. The stick method is favored.

Below — Important research has also been carried on in the control of coccidiosis in chickens. The diagram here shows the infection cycle of coccidia as revealed by such studies. From eight to 10 days is required to complete the cycle.



The late Robert Withycombe, for many years superintendent of the Eastern Oregon Branch Station, developed the valuable hybrid Union Beardless barley shown at left.

An early test plot of Federation wheat. The first such planting in the United States was made at Moro in 1916.

Right—Many hundreds of row tests of new grains are cut and wrapped separately for threshing as shown here.

A typical experimental range of grain varieties on the station. Note the tendency of some sorts to lodge, while the variety in center stands erect.

GRAIN

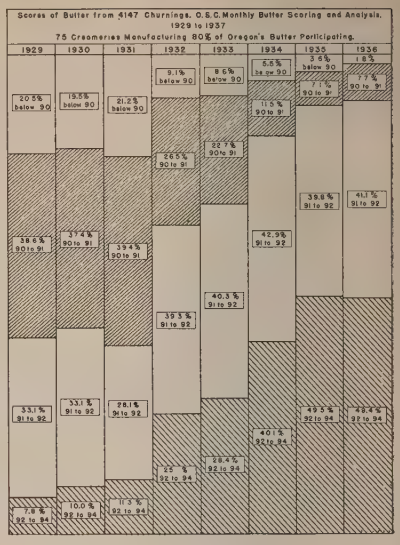
8—INTRODUCTION OF IMPORTANT GRAIN VARIETIES, PARTICULARLY FEDERATION WHEAT AND MARKTON OATS. Federation wheat, introduced at the Moro Station in 1916, became the most popular in the northwest, averaging two to five bushels an acre more than other standard varieties on soils to which it was adapted. Markton oats, bred at Moro, is a smut-resistant dry-land variety now favored throughout the west. Rex, a new hardy, smut-resistant fall wheat bred at Moro, is lately replacing much Federation acreage.

Dry land rotation plots at the Moro branch station which have been maintained for nearly 30 years.

[Front Cover—A crop of Support oats growing on the central station where it was developed as a support crop for vetch. It grows tall and has very stiff straw.]

Analyzing butter for composition. As a result of this work an improved technical balance was developed.

Above—Judges scoring contest butter, using a device developed at the Station for concealing the individual tub or box.



Right — Chart showing the progressive improvement in Oregon butter by years. Note the increase in high score butter below and the virtual elimination of the butter scoring under 90, charted at top.

Determination of yeast and mold count is made on all butter submitted for monthly scoring.

BUTTER

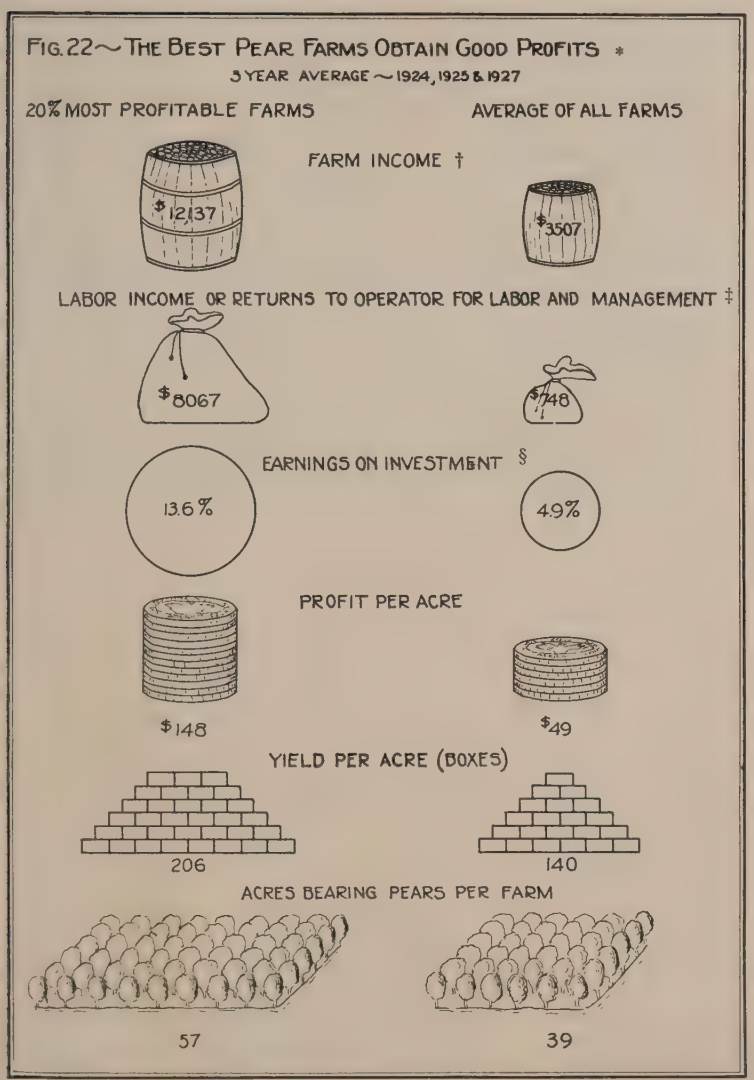
9—RESEARCH LEADING TO THE IMPROVEMENT OF OREGON BUTTER QUALITY. A definite campaign to better the average quality of Oregon's total butter production had as its foundation the research carried on by the Station. In less than 10 years the average quality has been increased enough to insure the retention of California and other out-of-state markets. Higher prices for better quality mean more than a half million dollars annually in added income for Oregon producers. A major factor in the improvement campaign was the confidential free butter scoring service conducted by the College, scenes from which are shown on this page.

Below—A scene during the early years of the scoring service. Later so many samples were sent in that special facilities for scoring were provided.

National authorities on dairy products manufacturing have been brought to the campus to lead conferences and teach special classes. Below is a demonstration of butter making in the college creamery.

Pears are picked green to ripen off the tree. Station investigators developed a pressure tester which accurately indicates maturity by pressure required to puncture fruit as shown on the Bosc pears above.

Bosc pears to attain high quality after storage must be ripened at fairly high temperatures, as is the case with bananas. Applying this principle discovered by Station scientists, eastern dealers use the barges shown above in the New York harbor to condition pears shipped to that market before they are sold to retailers.

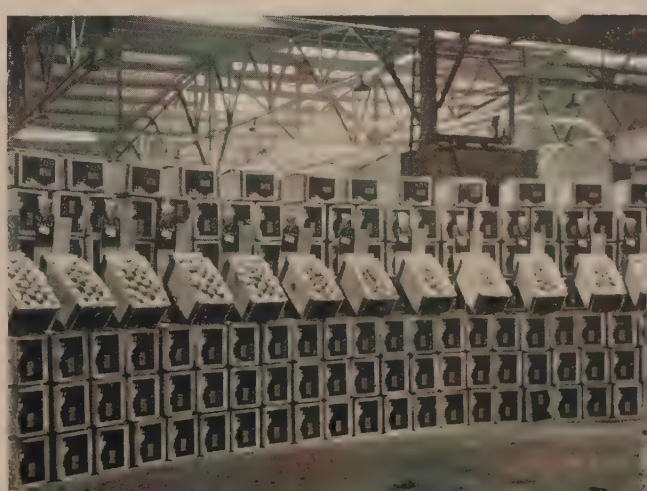


Studies in the economics of pear production have also been carried on. The chart above shows some of the outstanding facts developed in a study completed about 10 years ago.

PEARS

10—DEVELOPMENT OF NEW METHODS OF STORING, RIPENING AND MARKETING OREGON PEARS. Through research carried on by station scientists, the handling of Oregon winter pears has been placed on a scientific basis which makes possible the retention of important eastern markets. In the case of Bosc pears the industry was saved from disaster through the success of ripening methods carried out under controlled temperatures, enabling the fruit to reach consumers with natural high quality fully developed.

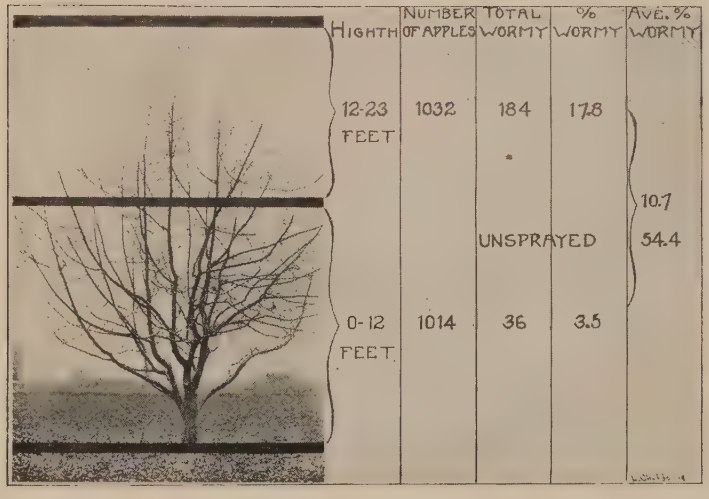
A carload of Oregon pears piled on the pier at New York ready for inspection of buyers.



Old style spray rig. Such scaffolds were used to overcome lack of pressure needed to cover tops of trees thoroughly.

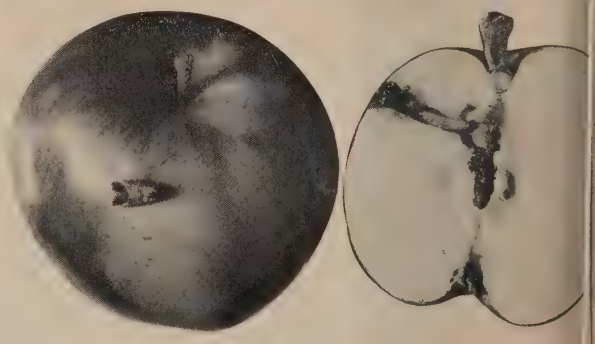
Below—Every stage of fruit development is charted in disease and pest control. This is the open calyx stage when an important codling moth spray is due.

World famous Hood River Valley with Mt. Hood in background, where scien production of fine apples was early developed. As long ago as 1916 the editor orchard magazine declared that spraying according to the recommendations Experiment Station saved the $1,500,000 apple crop of this valley.



Left—Such charts were used by the experiment station in em izing the need of thorough spraying of tree tops.

Below—Adult and larva of the codling moth. Despite ye fairly successful control, this is still the most universal an tructive apple pest, and is the object of continuous research



A modern spray system using a high-pressure central plant and underground distribution pipes.

The muslin cage shown below was used at the Hood River Branch Station to raise millions of insect parasites of the wooly aphis, which in turn had been found responsible for spread of perennial canker shown on the limb at right. Wooly aphis are now hard to find in the valley and the canker problem is no longer serious.

PESTS

11—DISCOVERY OF THE LIFE HISTORY AND CONTROL OF THE CODLING MOTH UNDER OREGON CONDITIONS. The pioneer research of the late Dean A. B. Cordley with codling moth, apple tree anthracnose and other pests and diseases paved the way for scientific control of these enemies of the fruit grower. Although these are a continuing problem never completely solved, the important fruit industry of this state could not have been developed without the aid of the disease and pest control work of the Oregon Experiment Station over the past half century.

Typical "pot-bellied" ewe suffering from bad infestation of liver flukes.

Profit from such typical western Oregon farm flocks has been made more certain through research in disease control.

FLUKES

12—CONTROL OF LIVER FLUKES IN SHEEP AND GOATS. Station veterinary scientists were the first to discover the role of a small Oregon snail in the life history of liver flukes which cause serious losses when they infest sheep or goats. Once the complete life history was discovered a control program was developed which included treating marshy spots in pastures with powdered copper sulfate which destroys the snails and thus breaks the life cycle of the flukes. A more recent achievement in the same field has been the discovery of the value of acidophilus milk in the control of certain types of sheep and calf scours.

These snails, shown natural size, were found to be alternate hosts for the liver flukes. Where these snails exist in wet spots of beautiful appearing pastures like that shown below, millions of the immature flukes may be found on grass blades ready to be swallowed by sheep while grazing.

A full grown liver fluke (Fasciola hepatica) magnified three times. It has been claimed that a single fluke can lay 50,000 eggs.

DAIRY HERD GRAZING ON
LADINO CLOVER PASTURE
DAIRY DEPARTMENT FARM
OREGON AGRICULTURAL EXPERIMENT STATION
THIRD PASTURE SEASON SEPT. 23 1930
NET RETURNS 1929 - $46.00 PER ACRE.
RETURNS IN 1930 WILL BE AS LARGE

This irrigated ladino clover pasture was established in 1928 on Station and previously abandoned as worthless for ordinary cropping. Its success ed to thousands of acres of such irrigated pastures in Western Oregon.

IRRIGATION

13—DEVELOPMENT OF SUPPLEMENTAL IRRIGATION IN WESTERN OREGON. Research on methods of applying supplemental irrigation to Western Oregon farms, and studies of the value of it, were carried on at the Experiment Station more than 20 years before widespread adoption of this practice was achieved. The results of this research, carried to the people through the Extension Service, is now the basis of profitable use of water on more than 20,000 acres of Western Oregon land. Surveys show that 700,000 acres would respond profitably to irrigation.

Newest 1937 irrigation development is this movable, low-pressure perforated pipe used in irrigating rough orchard land without drenching the trees.

Below—Believe it or not, this bean field on he Experiment Station was irrigated in 1913. Supplemental irrigation experiments were tarted at the Station in 1907.

Overhead revolving sprinkler irrigation of beans grown for canning in many parts of the Willamette Valley. Canneries now purchase only vegetables grown with irrigation.

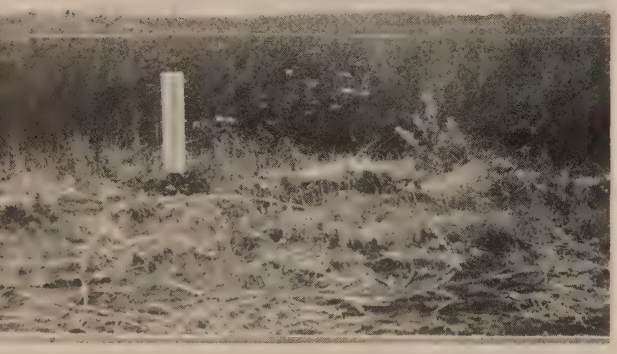
Left—An early Southern Oregon demonstration alfalfa field. Light colored strips received no sulfur.

Right—Sulfur showed striking results with clover in Central Oregon. These are typical plants from treated and untreated plots.

SULFUR

14—DISCOVERY OF THE VALUE OF SULFUR AS A FERTILIZER. Scientists of the Oregon Experiment Station first demonstrated in 1912 the striking response of alfalfa to the use of sulfur as a fertilizer both in Eastern and Southern Oregon. It was later shown to be equally valuable for some other legumes. Increases averaging a ton of hay to the acre were obtained on alfalfa, 100,000 acres of which were being grown on land responding to such treatment. Use of sulfur or sulfur carrying compounds is now standard practice in alfalfa producing regions throughout the west.

One of the original test fields in Central Oregon on the use of sulfur on alfalfa. Bottom plot, treated with sulfur, produced a ton per acre more than the top plot.



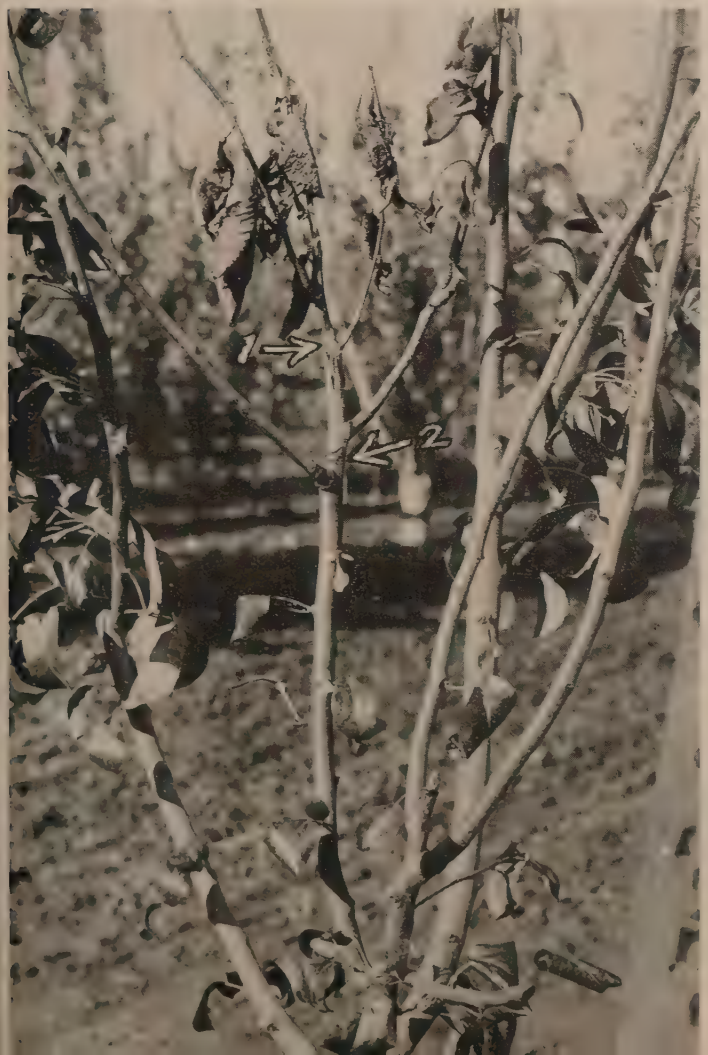
Alsike clover in Central Oregon responded equally well to use of sulfur. No sulfur at right.

Below—Greenhouse studies such as this are now showing the need, under certain conditions, of the rarer elements in soil such as boron and iodine.

Scene on the Medford Branch Station where a planting of blight resistant trunk stock on resistant roots has been made.

Showing blight-resistant trunk stock properly top worked to commercial variety by budding at white marks.

By having resistant trunk and root stock the framework of the tree is safe even though blight attacks the top. The picture below shows how blight that killed the Bartlett branch (1) stopped when it reached the resistant body stock (2).



BLIGHT

15—CONTROL OF PEAR BLIGHT. More fundamental accomplishments in the control of fire blight of pears have occurred at the Southern Oregon Branch Experiment Station than anywhere else in the United States. Through years of plant selection, root and trunk stocks have been developed which appear to be entirely immune to this disease which has eliminated commercial pear production in many sections of the world.

Seedlings completely immune to blight being grown for root stocks on the Southern Oregon Branch Station.

A Half Century of Agricultural Research

By JOHN C. BURTNER, Extension Editor

THE CHRONOLOGICAL story of the Oregon Agricultural Experiment Station is found only in the series of annual and biennial reports of the Station. The first such report, dated 1889, was submitted by Mr. E. Grimm, first director of the Station, and covered the period between the founding of the Station and June 30, 1889. It was addressed to "His Excellency, Sylvester Pennoyer, Governor of Oregon," and was signed by a special committee of the board of regents consisting of W. P. Keady, George M. McBride and F. A. Bailey, together with the secretary of the board, Wallis Nash.

What follows here is an extreme condensation of this chronological story obtained by taking brief excerpts from these reports and from certain other publications of the Station. Effort has been made to select representative items from each which would indicate the nature and scope of the work through the years, rather than attempt a selection of the most important accomplishments recorded in the various reports.

One of the most significant facts revealed by this kaleidoscopic survey is the long period that usually elapsed during the first 25 years between the time discoveries were made by the Station and their general application on the farms of the state. Under the Presidency of Dr. W. J. Kerr the Extension Service was organized in 1913 which eliminated much of this lag. In the account that follows it will be noted that by far the most fruitful years of the Station began with the assumption of the presidency by Dr. Kerr in 1907.

1887—The Hatch Act, making an annual appropriation of $15,000 to each state for the support of an agricultural experiment station, was passed by Congress and approved on March 2.

1888—Board of Regents of the Oregon State Agricultural College designated by Governor Sylvester Pennoyer to administer the grant in this state. E. Grimm appointed first director of the experiment station July 2. College farm consisted of 35 acres, mostly "white land." Experimental work with tile drainage started.

1889—College farm increased by 155 acres. Donations received of cattle from the four breeds, Jersey, Polled Angus, Durham, and Hereford. Spraying trees with paris green and banding the trunks advised for control of "codlin" moth.

1890—B. L. Arnold, president of the college, becomes director of the experiment station. Cooking ensilage found unprofitable. Fruit varietal tests started with 96 varieties of apples, 21 of plums, 16 of cherries, 42 of peaches, and 40 of strawberries and some others. Reported as "suited to our soil and climate" 15 varieties of potatoes, five varieties of corn tested for fodder only, six varieties of wheat, and 20 of oats, "and of these last the white Russian oats are the best."

1891—President John B. Bloss becomes director of the station. "It has been satisfactorily proved that the more hardy grasses and clovers will give good returns upon the white land when well drained and thoroughly cultivated." "It was recently well established that it is not profitable to feed whole oats or wheat when fattening pigs."

1892—Experiments with the "codlin" moth continued, and a mixture of IXL, water and paris green found effective "calling for fewer sprayings than anything tried heretofore." Woolly aphis reported as one of the worst pests. A control method for grain beetle was found.

1893—Nine farmers' institutes held. Need for a college dairy plant reported. Cattle feeding experiments carried on because "the day of range-fed beef is fast passing away and stall-fed beef is growing in demand." College spraying outfit exhibited at Chicago World's Fair. John Fulton, acting chemist, starts chemical study of grasses and clovers. Station photographer E. F. Pernot reports making engravings and photo-micrographs.

1894—Lard retails at 15 to 17½ cents per pound. Wheat is selling 40 to 60 cents per bushel. A bushel of wheat produced over 12 pounds of pork in live weight. "These figures would indicate that Oregon can successfully compete with the corn growing states," in growing pork for Oregon and coast markets. An IXL spray material consisting of dry lime, sulphur, and salt recommended to be added to paris green spray used for apple worms. George Coote, horticulturist, recommends careful selection of fruit-tree varieties to insure pollination.

1895—"The raising of red clover has ceased to be an experiment with us. . . . It will become much more common [in the Willamette valley] when its merits are more thoroughly known." "The value of a mere chemical analysis of a soil is most doubtful. . . It doesn't show how much of the plant food is available." Bordeaux mixture recommended as a spray for apple scab. Method of making "lime sulphur and salt wash" in two mixtures to be united just before using, described by F. L. Washburn, entomologist.

Co-eds helped garden on Lower Campus in 1891.

Professor Cordley Begins Work

1896—A. B. Cordley, new station entomologist, points out need of careful laboratory and field work to study life histories of injurious insects. U. P. Hedrick, botanist and horticulturist, with Cordley and H. B. Miller, director of the experiment station, join in issuing a comprehensive bulletin on prune growing, "the most important orchard industry in Oregon." "The question for the prune grower to determine is not, will there be an overproduction? but Can I produce near the lowest cost?" Flax cultivation advised by H. T. French to replace grain growing which was described as no longer highly remunerative.

1897—Nearly 200 varieties of grasses and forage plants seeded for test purposes. F. L. Kent reports on rations for dairy cows. Cordley reports successful spray program for peach-twig borer.

1898—Dr. James Withycombe as vice director of the experiment station, reports to President Thomas M. Gatch, director, that "the growing of fiber-producing plants has been dropped for the simple fact that it has been fully demonstrated that a good quality of flax and hemp can be grown in Oregon." Experiments with spraying for the hop louse conducted. Experiments conducted on using prunes affected with brown rot for the manufacture of brandy. Results were a product "that would not be called first class" but "probably equal in quality to much that is on the market."

1899—B. F. Irvine succeeds J. K. Weatherford as treasurer of the Board of Regents, signing the financial report of the experiment station. A. B. Cordley spends a six months' leave of absence at Cornell University, where he works out the life history of apple tree anthracnose, then locally known only as canker or dead spot.

1900—Cooperative work with the United States Department of Agriculture was started on the experimental growing of sandbinding grasses at Gearhart Park. Field tests made of 16 samples of red clover from different states and countries. Summer fallow system denounced as suicidal by A. L. Knisely, station chemist. Diseases of poultry and smutting of cereals reported on by bacteriologist, E. F. Pernot.

1901—"The station staff for the past year has worked mainly on practical subjects which were of immediate pecuniary interest to the agricultural classes. Examples of these are indicated in the chemist's report of his work on the evaporation of fruits, chemical study of silage, and soil analysis; and in the report of the entomologist of his work with curly leaf, bacterial diseases of strawberry plants and fungus diseases of wheat." Dr. James Withycombe reports that one of the most serious problems confronting the agricultural industry of the state is the subject of growing leguminous or humus-forming crops in the semi-arid portion of the state "Land that is producing at present satisfactory crops of cereals will be transformed into desert wastes, if some form of cropping cannot be devised to supersede the bare summer fallow." Growing of rape seed in Western Oregon recommended.

1902—"Professor Pernot, station bacteriologist, has by some investigation been able to can cheese and control its flavor as desired. This is a very valuable discovery. In this production there is no rind, no mold, no evaporation." "We have an abundance of material in this state for fruit and vegetable canning, and promotion of this industry should be taken up by the college and station."

1903—"It has been conclusively demonstrated by this station that alfalfa can be successfully grown in this section [Western Oregon]." Apple scab, San Jose scale and crown gall are the chief problems being studied by A. B. Cordley. Method of perpetuating pure cultures of organisms for butter starter developed by E. F. Pernot.

1904—"Horticultural work is practically nil. . . . The station suffers a serious embarrasment for the want of scientific and practical horticulturist." "There is evidently a large and profitable field for irrigation awaiting development in Western Oregon." "For several seasons the station has secured gratifying results from two general systemsof crop rotation." Inoculated soil distribution to farmers and work started in the development of bacterial cultures for legumes.

1905—C. I. Lewis added to the staff as horticulturist. Director Withycombe advocates broadening the scope of the station by the addition of work with poultry and apiculture. Feeding of skim milk to hogs found beneficial.

1906-07—Report made by Director James Withycombe to President W. J. Kerr. "Without doubt fruit growing is the most rapidly developing branch of agriculture at the present time. . . . . There should be a special representative of the station at Hood River." Cordley, dean of agriculture, starts study of stock solution of lime sulphur. "The growing of clover, vetch, alfalfa, rape and kale throughout the western portion of the state, we modestly claim, is almost entirely due to the efforts of this station. This change from the system of grain growing and the bare fallow has been worth millions of dollars to our farmers." One hundred acres of additional land needed. Duty of water studies started at Hermiston. First demonstration train operated through the Willamette Valley and the Columbia River Basin. E. F. Pernot makes report on tuberculosis as a disease of chickens.

President W. J. Kerr in 1907.

1908-09—"A block of 200 fowls was purchased from different breeders of the state last fall. Trap nests were installed in all of the houses and a record is being kept of the number of eggs laid by each hen. At the end of the laying year selection from this flock will be made on the basis of eggs laid, and these will be used for breeding next year. This is probably the most important line of work that the poultry department can carry on." James Dryden in charge of this poultry breeding work. Hermiston branch station established January 6, 1909. Union branch station studies finishing range cattle for market. Study of apple tree anthracnose advanced.

1909-10—Pumping plant installed and supplemental irrigation started on alfalfa, potatoes, clover, and corn. Organisms causing cherry gummosis isolated for first time. Dry-farming investigation started on the Moro branch station. Need of extension department reported to handle "all institute work and at the same time attend to much of the general correspondence of the station."

1910-11—Branch stations established in Harney Valley and Southern Oregon. A. B. Cordley continues detailed study of lime sulphur compound. More than 100 varieties of vetch tested; becoming a valuable seed crop. Irrigation proved valuable on a number of Western Oregon crops. Legume inoculation makes it "entirely practicable to grow alfalfa in the western part of the state."

World's First 300-Egg Hen Produced

1911-12—C 521, a hybrid "Oregon" breed hen, is first in the world to complete a trapnest record of 300 eggs in a year. Chemical spray investigations reveal the nature and reaction of lime sulphur spray. The dairy department reports on successful use of kale as a major dairy feed. The poultry department reported that "all records of the past three years indicate that by careful individual selection the laying qualities may be improved in any of the breeds."

1912-14—Dr. James Withycombe retired as director of the experiment station after 16 years of service. "Perhaps the most notable value of the experiment station work has been its influence for better agricultural and horticultural practices throughout the state, including its influence of better methods of handling livestock, especially the growing and fattening of swine." Strawberry breeding work started. Prune standardization investigations started to "effect a definite standard or standards for the commercially dried prune in the state . . . including the technique of evaporation, sanitation, chemistry of the product, molds, insect infestation, processing, grading, and packing for market." Potato diseases receive special attention.

1914-16—A. B. Cordley, now dean of agriculture and director of the experiment station, reports "The last biennium has been a period of retrenchment in expenditure and of curtailment of work. The legislature at its 1915 session by enactment of the law 'to repeal all continuous annual and standing appropriations' deprived the Oregon Experiment Station of all state support other than a few small appropriations for branch stations. The loss made it necessary to dispense with the services of nine members of the staff, to abandon entirely several lines of investigation and reduce other work." Experiments in Southern Oregon and near Salem revealed that sulfur is a fertilizer of great value for alfalfa. Studies of abortion and sterility in cattle started. Need of a horticultural by-products building urged.

One of the first test plots of Grimm alfalfa.

1916-18—First hen in the world to complete a trapnest record, of 1000 eggs in her lifetime is a white Leghorn bred and reared at Oregon station. War demands for grain bring new livestock feeding experiments. Cross pollination solves cherry orchard sterility at The Dalles. Pear harvesting and storage investigations conducted. Irrigation proved beneficial to vegetable crops in Willamette valley. Detailed soil surveys under way. Editor of Better Fruit says spraying according to station recommendations saved the $1,500,000 apple crop of the Hood River valley in 1916 which otherwise would have little if any market value.

1918-29—James T. Jardine succeeds A. B. Cordley as director June 1, 1920. Legislature increases appropriations in 1919, but increased costs and many resignations hamper investigations. Early plowing of summer fallow in Eastern Oregon advocated. Important progress in study of Bang's disease reported. Control of liver fluke through destruction of snails started. "Soy beans should become an important crop. Without inoculation they are not successful." A new spring wheat, Hard Federation, obtained from Australia, exceeds other spring wheats at Moro, Fire blight studies in Southern Oregon in fifth year.

1920-22—Outstanding results bring increased demand for station work on many unsolved problems. Both Hard Federation and Federation wheats found suited to practically all of Eastern Oregon. New laying record for Barred Rocks established. Recirculating prune driers developed, which save half the fuel, one-third the labor, and produce higher grade fruit. "Oregon could increase her production of hogs to 325,000 or 350,000 per annum, if all waste were utilized, and could do so at a profit." Grimm alfalfa introduced. Cost of production studies carried on. Instrument to test maturity of pears invented. Emergency project launched for control of European earwig. Profitable irrigation from wells demonstrated in Harney valley.

1922-24—Director Jardine reports, "The need of systematic studies in marketing of products of Oregon agriculture is again called to attention. Practically nothing has been attempted in this field by the experi-

An early Branch Station field day.

ment station staff. The problems are of such nature that little will be accomplished without the best effort and full time of at least one well qualified staff member. The expansion of the station program to this extent is not practicable with the funds and facilities now available." "The many years of experimental work looking to the establishment of alfalfa in the Willamette valley are beginning to bring success." Various grasses, tried for seed production, continue to give satisfactory yields. Virus diseases of potatoes and bramble fruits studied. Earwig parasites introduced. Forage programs for coast counties developed through use of lime with legumes.

1924-26—More USDA cooperative research established, including resumption of fiber flax investigations. Oregon Committee on Relation of Electricity to Agriculture formed. Federal Purnell act passed, permitting more attention to marketing investigations. Study of marketing of butter showed that "quality and standardization are altogether lacking." Milk marketing studies pursued. Cause of salmon poisoning in dogs discovering, confirmed and adding to earlier observations made by E. F. Pernot. Smut-resistant Markton oats introduced. First report presented on studies of coccidiosis in poultry. Experiment station started research work in home economics.

Spray Residue Problem Solved

1926-28—The most outstanding accomplishment of the biennium was the development of a practical solution of the problem of removing spray residue from fruit, an emergency that arose during the winter of 1925-26. It made demands upon all the resources of the agricultural experiment station such as may come only once in half a century. "The value of the station findings has been estimated in millions of dollars. A better measure is the actual fact that the greater part of the fruit crop was practically embargoed until the solution of the problem was found." Western yellow tomato blight found to be in reality curly top, which attacks numerous vegetables. Mosaic found to be the cause of breaking of tulips. Measures for controlling infectious abortion well established. New method found to vaccinate for chicken pox. Austrian winter field peas introduced. New greenhouses completed. Irrigated Ladino clover demonstrated as dairy pasture.

1928-30—A process and a machine for separating prunes into quality grades was developed, tested, and covered by public service patents. "This separation will improve the quality of the resulting dried product, speed up drier operation, and not increase the cost of handling." Western Oregon lamb marketing problem investigated, showing possible saving of $140,000 a year. Corvallis strawberry developed. The relation of woolly aphis to perennial apple canker discovered. Walnut blight control partially solved. Irrigation from wells introduced in the Willamette valley. Monthly butter scoring and analysis started. Reseeding of burned-over land studied. Good results obtained from irrigation of small fruits. Methods of bleaching cherries for maraschino developed. Preservation of berries

Test rows in strawberry trial plots.

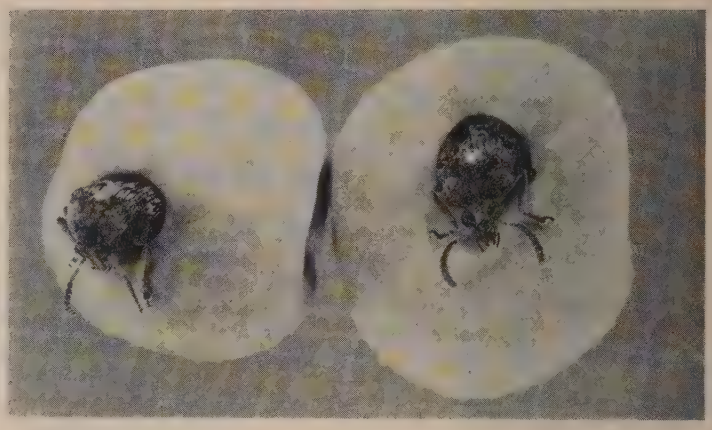
by freezing investigated. Use of crop residues in checking erosion studied at Moro.

1930-32—No complete report of the experiment station published for this biennium. "The major problem of the experiment station during the past biennium at a time when the economic conditions of the state required a heavy retrenchment of funds was to maintain the organic structure and the foundation of the technical organization and research built up through continuous efforts over a period of 45 years." James T. Jardine resigned after 11 years' service. Dean A. B. Cordley became dean emeritus, and the school of agriculture and the agricultural experiment station and Extension Service were combined under one administrative head in October, 1931, with Wm. A. Schoenfeld as dean and director. A total of 391 problems studied during the biennium. Cherry fruit fly controlled. Cooperative small-fruit breeding started with the U. S. D. A. Ripening methods for Bosc pears discovered. More than 30,000 acres in the Willamette valley are now devoted to alfalfa.

1932-34—Crested wheat grass, introduced at the Moro branch experiment station some 10 years ago becomes most promising forage grass for Eastern Oregon. Rex wheat developed, a smut-resistant hardy hybrid. Parasite of woolly aphis, introduced at Hood River branch station, shows effect in control. Chemically treated fruit wraps prevent scalds and rots in storage.- Electricity applied to soil sterilization, hotbed heating, corn and hop drying, and home-made brooders. Relation of moisture and irrigation to pear production in Rogue River valley studied at Medford branch station. Grass established in waterways in wheat fields to check erosion at Pendleton branch station. Baby beef fattening proved practical in Eastern Oregon.

1934-36—Research units in wildlife conservation established in cooperation with bureau of biological survey and State Game commission. Use of acidophilus milk found to be cure of dysentry in young lambs and calves. Ethylene gas, discovered as emanating from ripe pears, found to explain a number of baffling storage problems. Emergency attention of entomologists directed against spittle bugs and pea weevils made distinct progress in control. Report on public expenditures in Oregon as measured by property tax levies. Range livestock station at Squaw Butte consisting of 16,000 acres of range land established to serve entire West.

The huge pea canning and freezing industry in the northwest has apparently been saved through successful large-scale dusting with rotenone (above) to control pea weevils, using methods and machines developed by state and federal specialists at the Oregon Station. Right—Adult weevils emerging from peas. (Greatly enlarged.)



CURRENT RESEARCH

On this and the following page are pictures representing a few of the hundreds of current research projects. Present scope of the Experiment Station activity is indicated by the following classification of projects and functions involved:

Protecting crops and livestock, 59 projects; improved quality to win and hold markets, 34; introducing, testing and breeding superior strains, 31; developing more economical production methods, 57; analyzing cost of production and economic efficiency, 19; conserving soil fertility and testing irrigation, 34; testing farm home conveniences and management, 3; total, 237.

Healthy strawberry plant (left) and one affected by crinkle disease. A program of plant certification is helping control this.

Fiber flax grown on the Station in testing new varieties and cultural practices.

Below—Special selection from pyrethrum plants grown on the Station in studying the culture of this plant, source of a valuable insecticide.

New college dairy barn built with WPA assistance, uncompleted when this picture was taken. Embodying new principles in design, this barn will be the center of future research in dairy production methods.

A new field of research is that in fish, game and fur animal management. At left an electrical thermometer is connected with a wild pheasant's nest to record hatching temperatures.

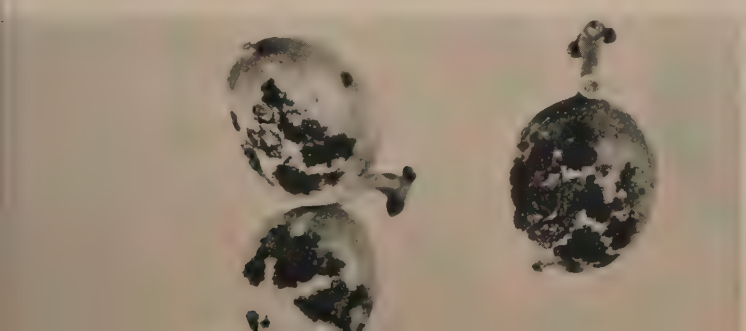
Right—A mule deer fawn attempting to hide in old corn patch. (U.S.B.S. photos.)

Shelter made of slats used in studying the control of curly top (blight) of tomatoes in Eastern Oregon.

Each little box contains eggs of the potato flea beetle, a serious pest now under investigation.

Below—A field of calla lilies in a coast county. Bulb disease investigations aid this important Oregon industry.

Below—Blight on immature English walnuts. A control program worked out at the Station is being further perfected.



The BRANCH

Few states have as widely varying Agricultural conditions as Oregon. Among important producing areas, for example, rainfall may be 10 times as heavy in one as in another, and the growing season be four times as long in one section compared with another. To serve the entire state, therefore, it has been necessary

Top Right—Medford Branch Station. Irrigation, drainage, soil fertility and related problems of commercial orchards in Southern Oregon.

Established	1931
Elevation	1456 feet
Average Annual Rainfall	18.08 inches
Average Growing Season	154 days
Lowest Winter Temperature	—10° F.

Top Left—Umatilla Branch Station, Hermiston. Irrigation and cropping methods for sandy soils; dairy and poultry management problems.

Established	1909
Elevation	451 feet
Average Annual Rainfall	8.4 inches
Average Growing Season	163 days
Lowest Winter Temperature	—36° F.

Left Above—Pendleton Branch Station—Tillage, fertility and cropping methods on wheat land of higher rainfall. Varietal breeding.

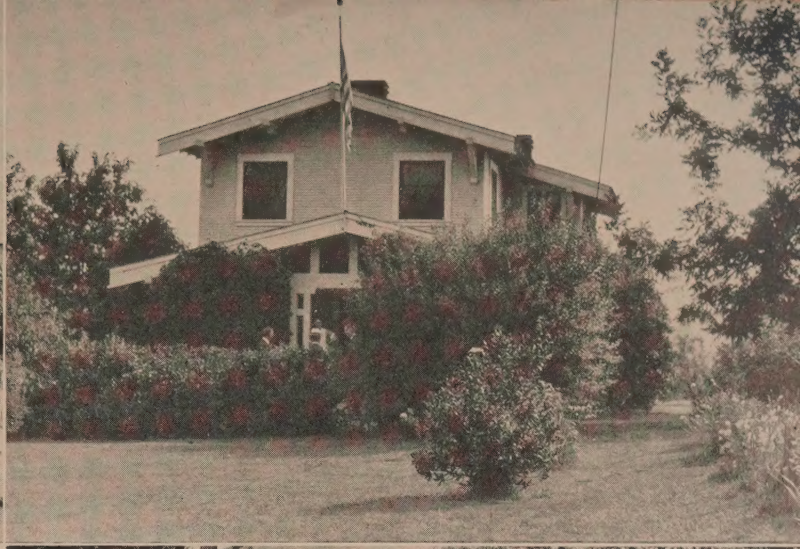
Established	1927
Elevation	1440 feet
Average Annual Rainfall	13 inches
Average Growing Season	149 days
Lowest Winter Temperature	—28° F.

Left Center—Squaw Butte Range Livestock Station, Burns. Range improvement, grazing, breeding and management of cattle and sheep. (See also back cover.)

Established	1935
Elevation	4500 feet
Other data similar to Harney Station.	

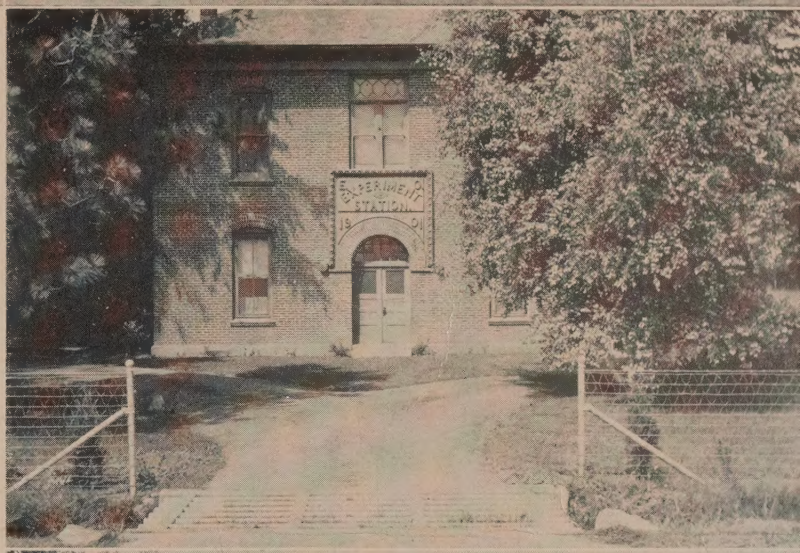
Left Bottom—Sherman County Station, Morrow. Dry land cereal production methods, varietal breeding and testing, forage grass nurseries, crop rotation, soil conservation.

Established	1909
Elevation	1838 feet
Average Annual Rainfall	11 inches
Average Growing Season	150 days
Lowest Winter Temperature	—22° F.



TATIONS

tain 10 branch experiment stations to supplement esearch at the central station at Corvallis. On pages all 10 branch stations are represented by res of the headquarters residence, the office build- or in the case of Hood River, by the combined ng house and laboratory building.



Left—Field day at Harney Branch Station, Burns. Crops methods for high altitudes and short, dry growing sea- livestock management as "home ranch" for Squaw range.

Established	1911
Elevation	4150 feet
Average Annual Rainfall	7.78 inches
Average Growing Season	63 days
Lowest Winter Temperature	—45° F.

Right—Southern Oregon Branch Station, Talent. Or- disease and insect control; fruit harvesting, storing; able and general farming problems.

Established	1911
Elevation	1550 feet
Average Annual Rainfall	16.42 inches
Average Growing Season	165 days
Lowest Winter Temperature	—9.7° F.

Above—Eastern Oregon Livestock Station, Union. ng and management of cattle and sheep. Crop studies lue Mountain region.

Established	1901
Elevation	2787 feet
Average Annual Rainfall	13 inches
Average Growing Season	118 days
Lowest Winter Temperature	—24° F.

Center—Astoria Branch Station. Forage and cash production under coast conditions; dairy management; ver" land utilization.

Established	1913
Elevation	175 feet
Average Annual Rainfall	77 inches
Average Growing Season	282 days
Lowest Winter Temperature	+10° F.

Bottom—Hood River Branch Station. Fruit produc- roblems such as disease and pest control, hardiness, ation, irrigation, fertilization.

Established	1912
Elevation	300 feet
Average Annual Rainfall	32 inches
Average Growing Season	184 days
Lowest Winter Temperature	—27° F.

Above: Headquarters of 16,000 acre Squaw Butte Range Experiment Station, Harney Co

Below: Native Oregon bunch grass rehabilitated through protection against over grazin